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The Role of Canines on Smile Attractiveness บทบาทของฟันเขี้ยวต่อความสวยงามของรอยยิ้ม

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ABSTRACT

To evaluate the influence of canines on smile attractiveness and gender of the smile. A smile image of Thai male was altered based on the two factors: inclination and width of canine. The images were shown to 60 Thai laypeople who were asked to rate smile attractiveness using visual analog scale, select the gender of the smile and choose the smile which represents the most masculine and feminine smile. The smile with straight axis or 10° palatally inclined axis and 42% or 62% width of canine was rated as the most attractive smile. The 10° buccal axis and the 102% width were chosen as the most masculine canine. The 10° palatal axis and the 42% width were chosen as the most feminine canine. The feature of canine influences smile attractiveness and tends to affect gender of the smile.

บทคัดย่อ

วัตถุประสงค์เพื่อศึกษาของอิทธิพลของฟันเขี้ยวต่อความสวยงามของรอยยิ้มและเพศของรอยยิ้ม โดยนำภาพ รอยยิ้มของชายไทย มาปรับเปลี่ยนตามปัจจัย 2 ตัว คือ แนวแกนเอียงของฟันเขี้ยว และ ความกว้างของฟันเขี้ยว ภาพ รอยยิ้มจะนำมาให้บุคคลทั่วไป 60 คน ให้คะแนนความสวยงามโดยวิชวลอนาล็อกสเกล เลือกเพศของภาพรอยยิ้ม และ เลือกภาพรอยยิ้มที่แสดงความเป็นชายและหญิงมากที่สุด การศึกษานี้พบว่า รอยยิ้มที่มีฟันเขี้ยวที่ตั้งตรงหรือที่มีแนวแกน เอียงไปทางเพดานปาก 10° และที่มีขนาด 42% หรือ 62% ของความกว้างของฟันตัดซี่ข้าง มีความสวยงามมากที่สุด ฟันเขี้ยวที่มี แนวแกนเอียงไปทางแก้ม 10° และ ฟันเขี้ยวที่กว้าง 102% ถูกเลือกว่าแสดงความเป็นเพศชายมากที่สุด จึงสรุปว่า ลักษณะของฟันเขี้ยวมีผลต่อความสวยงามของรอยยิ้ม และ มีแนวโน้มส่งผลถึงความเป็นเพศชองรอยยิ้ม

Keywords: Esthetic perception, Smile, Canine คำสำคัญ: การรับรู้ความสวยงาม รอยยิ้ม ฟันเขี้ยว

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Introduction

The focus on facial and smile esthetic has recently increased. Many patients seek orthodontic treatment to get an attractive smile besides function. Canines are in the transition zone between anterior and posterior teeth. They also play an important role not only in function but also in esthetics (Bothung et al., 2015).

There are several factors affecting the smile esthetic such as smile arc, tooth angulation, tooth inclination and tooth proportion (Kokich et al., 1999; Levin, 1978; Lombardi, 1973; Tan et al.; 2018; Xu et al., 2015). The theory of golden proportion by Levin stated that the perceived width of the maxillary lateral incisor when viewed from the front should be 62% of the width of the central incisor and the maxillary canine should be 62% of the width of the lateral incisor (Levin, 1978; Lombardi, 1973). Conversely, some studies reported that the golden proportion was not considered the most attractive smile (Tan et al., 2018). Furthermore, the golden proportion does not present in the majority of natural dentition (Hasanreisoglu et al., 2005). There are gender variations in the tooth dimensions. The maxillary central incisor and canine mesiodistal widths of women were smaller than those of men. The width of the canine appeared the greatest gender difference (Hasanreisoglu et al., 2005).

Another part of beautiful smile is inclination of canine. According to Rufenacht et al., The smile showing a parallelism between the canine tooth axis and the imaginary line formed by the lateral canthus and the corner of the mouth (EM-line) is the most esthetic smile (Rufenacht, 2020). Furthermore, Bothung et al found that the participants prefer the maxillary canine axis which is parallel to the EMline or slightly inward especially in female images. Palatal inclination of canine increases the femininity of smile (Bothung et al., 2015). However, there are a few studies evaluate the feature of the maxillary canines on smile attractiveness and gender of smile in Thai population. The influence of canines on smile esthetic attractiveness are still inconclusive.

Objective of the study

The aim of this study is to evaluate the influence of maxillary canines on smile esthetic attractiveness and gender of smile.

Methodology

This study was approved by the Human Research Ethics Committee of the Faculty of Dentistry, Chulalongkorn University. The sample size was calculated by G-power program. The input parameters were α = 0.05 and β = 0.8. The following input data were mean and standard deviation from the study of Lemos et al. (Lemos et al., 2019). The sample size calculation indicates that 40 subjects were needed.

Sixty Thai laypeople, aged between 20 and 45 years old, were recruited to this study. The participants were recruited from universities and offices. Dental professionals were excluded from this study.

Photograph

The selected smile was a frontal close-up view of a young adult Thai male. The photograph was digitally altered by professional of computer graphics animation using Adobe Photoshop CS6 (Adobe Systems Inc., San Jose, CA). The photograph was modified to create a symmetrical image and were retouched to adjust color and brightness. After that it was altered based on the two variables: inclination and perceived width of canines

1. Inclination of canine

The buccal surface of the maxillary canines was altered at 10° incremental (-20°, -10°, 0°, +10° and +20°) in relation to a horizontal line connecting the right and left canines' tips. Positive value was alteration in the buccal direction and negative value was alteration in the palatal direction. The photograph was altered to produce bilaterally symmetrical images.

2. Perceived width of canine

The width of the maxillary canine was altered at 20% intervals (22%, 42%, 62%, 82% and 102%) in relation to the subjects' maxillary lateral incisor. The photograph was altered to produce bilaterally symmetrical images and keep the dimensions of the mouth and lips the same, only the proportions of the teeth were altered.

Questionnaires

Questionnaires were divided into three parts.

Part1- The questionnaires collected the demographic data from participants. The detailed information consisted of gender, age, education level and occupation.

Part2- The manipulated photos were presented to the participants in the form of PowerPoint presentation. Each set of photos consisted of five different photographs. Participants were asked to rate each image in each slide in terms of smile attractiveness using visual analog scale (VAS) and select the gender of the evaluated smile in 60 seconds. Participants marked a position along 100-mm visual analog scales; the left end represented the least attractive smile, and the right end represented the most attractive smile. The choice of gender are male, female and can be either gender.

Part3- Each slide represented group of five images of two factors in random order. Participants were asked to select the most masculinity and the most femininity of image in different slide. If there was no image which represents masculinity or femininity, participants would select no different option

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Statistical analysis

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Statistical analysis was performed by using SPSS (Version 500.0, SPSS, Chicago, Ill) The VAS score was not normally distributed test by the Kolmogorov-Smirnov test. Mean VAS score in each image was compared by Friedman test followed by Wilcoxon Signed rank tests for pair-wise comparisons. The frequency of gender which was selected in each image and the frequency of image which was selected as the most masculinity and femininity were reported by descriptive statistic.



Figure 1 Altered inclination of canine using 10° increments; A. 20° palatally inclined; B 10° palatally inclined; C 0°; D 10° buccally inclined; E 20° buccally inclined



Figure 2 Altered perceived width of canine using 20% increments in relation to the maxillary lateral incisor; A. 22%; B 42%; C 62%; D 82%; E 102%

Results

Thirty Thai males and 30 Thai females participated in this study. The mean ages were 30.83 years old. The inclination of canine (P<0.001) and the perceived width of canine (P<0.001) had statistically significant influences on the score. The gender, age, education level and occupation did not affect on the esthetics score.

The evaluation of the altered inclination of canine images revealed that the most attractive smiles were those in which the canine was 0° inclined (mean VAS score 67.07) and those in which the canine was 10° palatally inclined (mean VAS score 65.26). The least attractive smile was the one in which the canine was 20° buccally inclined (mean VAS score 41.92). (Fig. 3)

The 62% (mean VAS score 63.06) and 42% (mean VAS score 59.51) of canine width in relation to lateral incisor was rated as the most attractive images, Whereas 102% (mean VAS score 35.06) was rated the least attractive smile. (Fig. 4)

"Can be either gender" was selected by most of the participants in all different inclination of canine. The percentage of gender selected as male was 16.67, 26.67, 20, 28.33 and 35 in the image with -20°, -10°, 0°, +10° and +20° inclination of canine respectively. The frequency of gender selected as female was 35, 28.33, 25, 26.67 and 16,67 in the image with -20°, -10°, 0°, +10° and +20° inclination of canine respectively. The 10° buccally inclined of canine was selected as most masculine (25%). 7 participants (11.67%) selected 'no different' of masculinity. The 10° lingually inclined and straight of canine was selected as most feminine (23.33%). 10 (16.67%) participants selected 'no different' of femininity. (Fig. 5)

Most participants selected "can be either gender" in all different perceived width of canine. The percentage of gender selected as male was 20, 20, 21.67, 26.67 and 41.67 in the image with 22%, 42%, 62%, 82% and 102% perceived width of canine respectively. The frequency of gender selected as female was 40, 26.67, 26.67, 18.33 and 23.33 in the image with 22%, 42%, 62%, 82% and 102% perceived width of canine respectively. The perceived width of canine which was selected as most masculine was 102% (23%) and the canine which was selected as most feminine was 42% (25%). 13 (21.67%) and 3 (5%) participants selected 'no different' of masculinity and femininity respectively. (Fig. 6)



Figure 3 VAS for different inclination of canine

*values with the same letters are statistically not different (p < 0.05 according to the Wilcoxon Signed rank tests)





*values with the same letters are statistically not different (p < 0.05 according to the Wilcoxon Signed rank tests)

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Figure 5 The altered inclination of canine A. Percentage of gender which was selected on each image; B. Percentage of the image which was selected as the most masculine and feminine



Figure 6 The altered perceived width of canine A. Percentage of gender which was selected on each image; B. Percentage of the image which was selected as the most masculine and feminine

Discussion

Participants selected the most attractive smiles when the maxillary canine tooth axis was 0 or -10 degree. These results confirmed that the palatal crown inclination of canine is more tolerated than the buccal crown inclination. (Lemos et al., 2019; Xu et al., 2015) According to Rufenacht et al., the smile showing a parallelism between the canine tooth axis and the imaginary line formed by the lateral canthus and the corner of the mouth (EM-line) is the most esthetic smile. (Rufenacht, 2020) Bothung et al. found that the participants preferred the maxillary canine axis which was parallel to the EM-line or slightly inward. (Bothung et al., 2015) The result from several studies and ours may infer that slightly palatal inclination of canine does not affect attractiveness of smile whereas slightly buccally inclined canine was considered unattractive. Our outcome found that the golden proportion width of upper canines was the most attractive smile. Up to now, no studies so far have investigated the influence of

canine's proportion on smile esthetics. There is only golden proportion theory shown by Levin and Lombardi which described the distal tooth with 62% of the width of the mesial tooth as the most esthetic proportion. (Levin, 1978; Lombardi, 1973) Conversely, The evidences rejecting the golden proportion regarding the width of lateral and central incisors have been increasing. (Tan et al., 2018; Wolfart et al., 2005) Wolfart et al. showed that the proportion which is the most attractive appearance is 50–74%. (Wolfart et al., 2005) Moreover, Tan et al. stated that the smile with 57% lateral incisor was considered as the most attractive smile. (Tan et al., 2018) This study also showed that 42% width or a bit smaller size of canine does not decrease the attractive score.

In some cases which canine needs to be removed such as impaction. Premolar substitution did not affecting the smile esthetic although the mesiodistal width of premolar was slightly smaller than that of canine. (Thiruvenkatachari et al., 2017)

The perceived width of teeth will increase or decrease due to tooth axis, rotation and alignment. From the frontal view, the image which has the widest canine was the least attractive. Canine was more prominent than central and lateral incisor teeth. This may be because the teeth looked malaligned as the canines were disproportionally wide.

Based on our findings, "Can be either gender" in most of the images that alter inclination of canine were selected more than choice of male and female. These may be caused by other variables on the image such as lip color, lip texture, skin texture and brightness had the influences on gender of the smile over the teeth. The lip and the skin were not different in each image. However, The smiles with the outward canines were selected as male more than female while the smiles with the inward canines were selected as female more than male. In addition, the canine which was selected as most masculine was 10° buccally inclined and the canine which was selected as most feminine was 10° lingually inclined. Our study, consistent with the study of Bothung et al., found that participants preferred the maxillary canine axis which was parallel to the EM-line or slightly inward especially in female images. Palatal inclination of canine, the smaller size of canine was selected as female more than male. In natural teeth, the perceived width of male teeth are bigger than female teeth with the greatest difference at the canine. (Hasanreisoglu et al., 2005) The smaller perceived width of canine may also affect perceived of dental arch which female was smaller than male. (Kairalla et al., 2014) The perceived width of canine tends to affect the smile.

The axis and size of canine affect the smile esthetics but may or may not affect the gender identity of smile. Due to small sample size of this study, we cannot indicate the relationship between the canine and the gender of the smile. To conclude these hypotheses, a number of sample size should be increased.

Conclusion

The feature of canine influences smile attractiveness and tends to affect gender of the smile. Participant prefer canine with straight axis or slightly inward. The outward canine is consider as unpleasant. The smile with 42-62% width of canine was rated as the most attractive smile and the smile with 102% width of canine was rated as the least attractive smile. Buccal inclination and bigger size of canine tends to increase masculinity while palatal inclination and smaller size of canine tends to increase femininity of smile.

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